ADDITIONAL

Service Manual

PIONEER

ORDER NO.
ARP1061-A

FM/AM DIGITAL SYNTHESIZER TUNER

F-X55ZA(BK) ZP

TX-555ZA(BK) ZP

- **For servicing these types, please refer to the F-X55ZL (BK)/ZEB service manual (ARP1058) with the exception of this additional service manual.**

- This additional service manual is applicable to the F-X55ZA (BK)/ZP and TX-555ZA (BK)/ZP types.
- F-X55ZA (BK)/ZP and TX-555ZA (BK)/ZP are provided with AM stereo demodulation circuit.

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1. CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

The F-X55ZA (BK)/ZP and TX-555ZA (BK)/ZP types are the same as the F-X55ZL (BK)/ZEB type with the exception of the following sections.

Mark	Symbol & Description	Part No.			Remarks
		F-X55ZL(BK)/ZEB	F-X55ZA(BK)/ZP	TX-555ZA(BK)/ZP	
	PVC panel	AAK1009	AAK1037	AAK1091	
	Front panel	AMB1002	AMB1072	AMB1071	
	Bonnet case	ANE1003	ANE1003	ANE1028	
	Packing case	AHD1008	AHD1091	AHD1092	
	Supplementary instructions	ARH-051	ARH-084	ARH-084	
	Tuner assembly	GWE-270	GWE-275	GWE-275	
	AM MPX assembly	. . .	AWD-018	AWD-018	

2. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 × 10¹*	*561*	*RD1/4PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN1/4SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

MISCELLANEOUS PARTS

Mark	Symbol & Description		Part No.
		Tuner assembly	GWE-275
		Switch assembly	Non supply
		LED assembly	Non supply
		AM MPX assembly	AWD-018
		FM antenna	AHD-005
	L1	Loop antenna assembly	ATB-102

Tuner Assembly (GWE-275)

SEMICONDUCTORS

Mark	Symbol & Description		Part No.
★★	IC301	MPX IC	AN7470P
★★	IC401	AM/FM IC	LA1260S
★★	IC702	PLL IC	TC9157AP
★★	IC701	PLL IC	TD6104P
★★	IC703	DISPLAY IC	TD6301AP
★★	Q304, Q408, Q605, Q607		2SA1048 (2SA933S)
★★	Q407		2SA933S
★★	Q401		2SC1740S
★★	Q701, Q702		2SC1740SLN
★★	Q301 – Q303, Q402 – Q404, Q606, Q608, Q703 – Q707		2SC2458 (2SC1740S)
★★	Q103, Q201		2SC2668
★★	Q102		2SC2786
★★	Q104, Q105, Q406		2SK161 (2SK241)
★★	Q101		2SK241
★	D405, D605		RD5.6EB (HZ5.6EB)
★	D401, D402		SVC321C2/D2
★	D720		1SS131
★	D301, D404, D406 – D410, D702 – D704, D707 – D709		1SS131
★	D101 – D103		1SV147

SWITCHES

Mark	Symbol & Description	Part No.
★★	S3 – S11, S15, S16 Tact switch (STATION CALL, MEMORY AM, FM)	ASG-711 (ASG-703)

COILS, TRANSFORMERS AND FILTERS

Mark	Symbol & Description		Part No.
	L401	AM OSC coil	ATB-110
	L101	FM ANT coil	ATC-192
	L102	FM ANT coil	ATC-193
	L103	FM OSC coil	ATC-214
	L202	FM DET coil	ATE-072
	L203	Inductor	ATH-116
	L104, L105, L201	Inductor	ATH-049
	T401	AM ANT transformer	ATB-099
	T402	AM IF transformer	ATB1002
	T101	FM RF transformer	ATC-194
	T102	FM matching transformer	ATE-063
	F202	FM ceramic filter	ATF-107
	F201	FM ceramic filter	ATF-119
	F401	AM ceramic filter	ATF1004

CAPACITORS

Mark	Symbol & Description	Part No.
	C713 Electrolytic (3300μF/10V)	ACH-389
	TC401, TC402 Ceramic trimmer	ACM-015
	C716	CCCCH180J50 (CCDCH180J50)
	C416, C718	CCCSL221J50 (CCDSL221J50)
	C117, C401	CCDCH080D50
	C115, C404, C717	CCDCH150J50
	C116	CCDCH330J50
	C101, C102, C105, C106	CCDRH390J50
	C108	CCDSL020C50
	C109, C111, C112	CCDSL050C50
	C110, C426	CCDSL101J50
	C119	CCDTH180J50
	C422	CEANP4R7M35
	C308, C427	CEASR22M50
	C425, C702, C709, C711, C712	CEAS010M50
	C306, C705	CEAS1R5M50
	C418, C605, C607, C723	CEAS100M25
	C312, C313, C423	CEAS2R2M50
	C303, C604	CEAS221M16
	C301, C302, C307, C701	CEAS3R3M50
	C703	CEAS330M16
	C406	CEAS4R7M50
	C311, C414	CEAS470M25
	C720	CEAS471M16
	C714	CEAS471M6
	C309, C310, C410, C411	CKCYB102K50 (CKDYB102K50)
	C314, C315	CKCYB472K50 (CKDYB472K50)
	C305, C412, C413, C419, C710	CKCYF473Z50 (CKDYF473Z50)
	C415	CKCYX473M25 (CKDYX473M25)
	C104, C107, C113, C114, C118, C201, C403, C420, C450, C704, C706 – C708, C721, C722, C724	CKDYF103Z50
	C103, C121, C214, C402, C407, C408, C715, C719	CKDYF223Z50
	C405	CQSA431J50
	C304	CQSA471J50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
★	VR301	Semi-fixed (4.7kΩ)	VRTB6VS472
★	VR401	Semi-fixed (220kΩ)	VRTB6VS224
⚠	R601	Metal oxide	RS1LMF151J
	R720, C421	Resistor array	RA12S473J
	R404, R421, R431, R432		RD1/4PM□□□J
		Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description		Part No.
		Terminal (ANTENNA) (PAL, 4P)	AKA1002
		Socket (6P)	AKP-083
★	V1	Fluorescent tube	AAV-028
★	X701	Crystal resonator	ASS-025

Switch Assembly

SWITCHES

Mark	Symbol & Description		Part No.
★★	S12, S13	Tact switch (UP-DOWN)	ASG-711 (ASG-703)

LED Assembly

SEMICONDUCTORS

Mark	Symbol & Description		Part No.
★	D901	LED (STEREO)	AEL-382
★	D902	LED (TUNED)	AEL-424

AM MPX Assembly (AWD-018)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC901	MC13020P
★★	Q904, Q910	2SA933S (2SA1115)
★★	Q902, Q903, Q905 – Q908, Q911	2SC1740S (2SC2603)
★★	Q901	2SC2668
★★	Q909	2SC3400
★	D903	RD9.1EB (HZ:9.1EB)
★	D902	1SS131
★	TH901	TH103

COIL

Mark	Symbol & Description		Part No.
	L901	Inductor	ATH-116

CAPACITORS

Mark	Symbol & Description	Part No.
	C915	CCDCH470J50
	C916, C917	CEASR47M50
	C902, C910	CEAS100M25
	C933	CEAS101M16
	C904, C911, C919, C931, C932	CEAS2R2M50
	C934, C936	CEAS220M25
	C935	CEAS330M16
	C903, C918, C920	CEAS4R7M50
	C912	CEAS470M10
	C909	CKCYB102K50 (CKDYB102K50)
	C906 – C908, C913	CKCYB332K50 (CKDYB332K50)
	C929, C930	CKCYB222K50 (CKDYB222K50)
	C901, C905, C914	CKCYF103Z50
	C923 – C928	CQMA154J50

RESISTORS

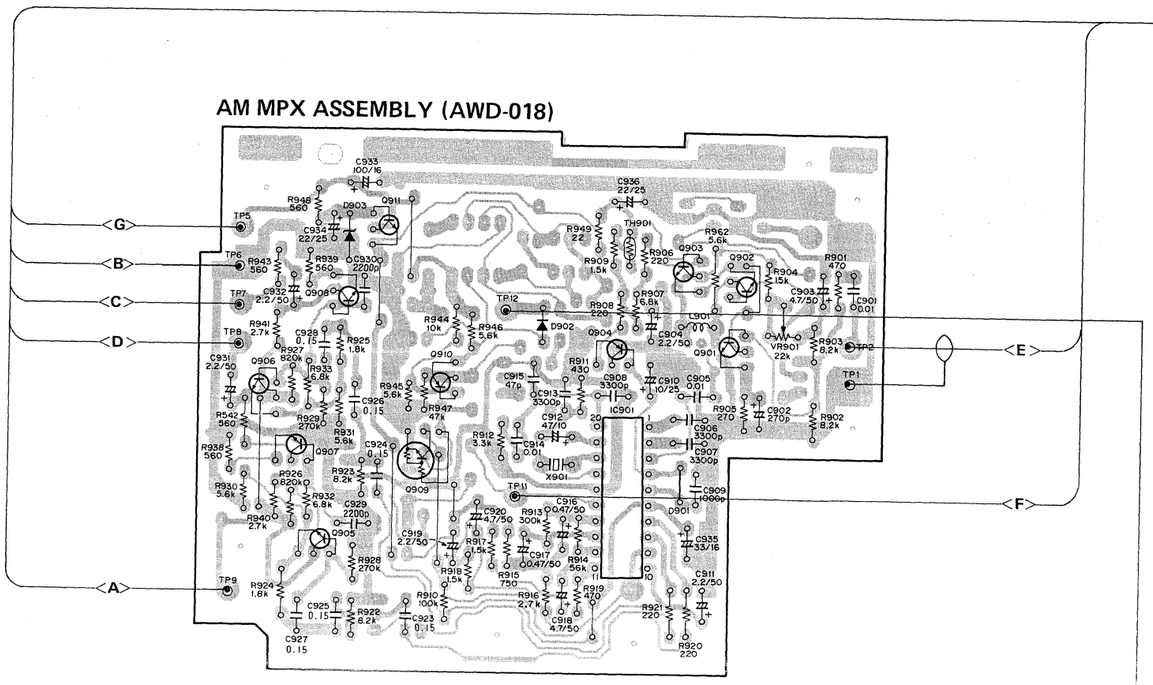
NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
★	VR901	Semi-fixed (22k)	VRTB6VS223
		Other resistors	RD1/8PM □□□J

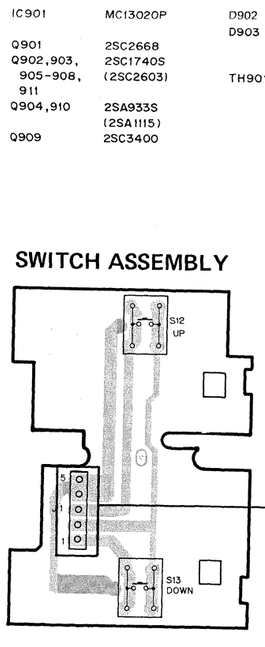
OTHERS

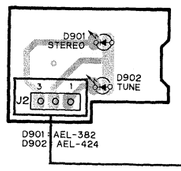
Mark	Symbol & Description		Part No.
★	X901	Ceramic resonator	ASS-045

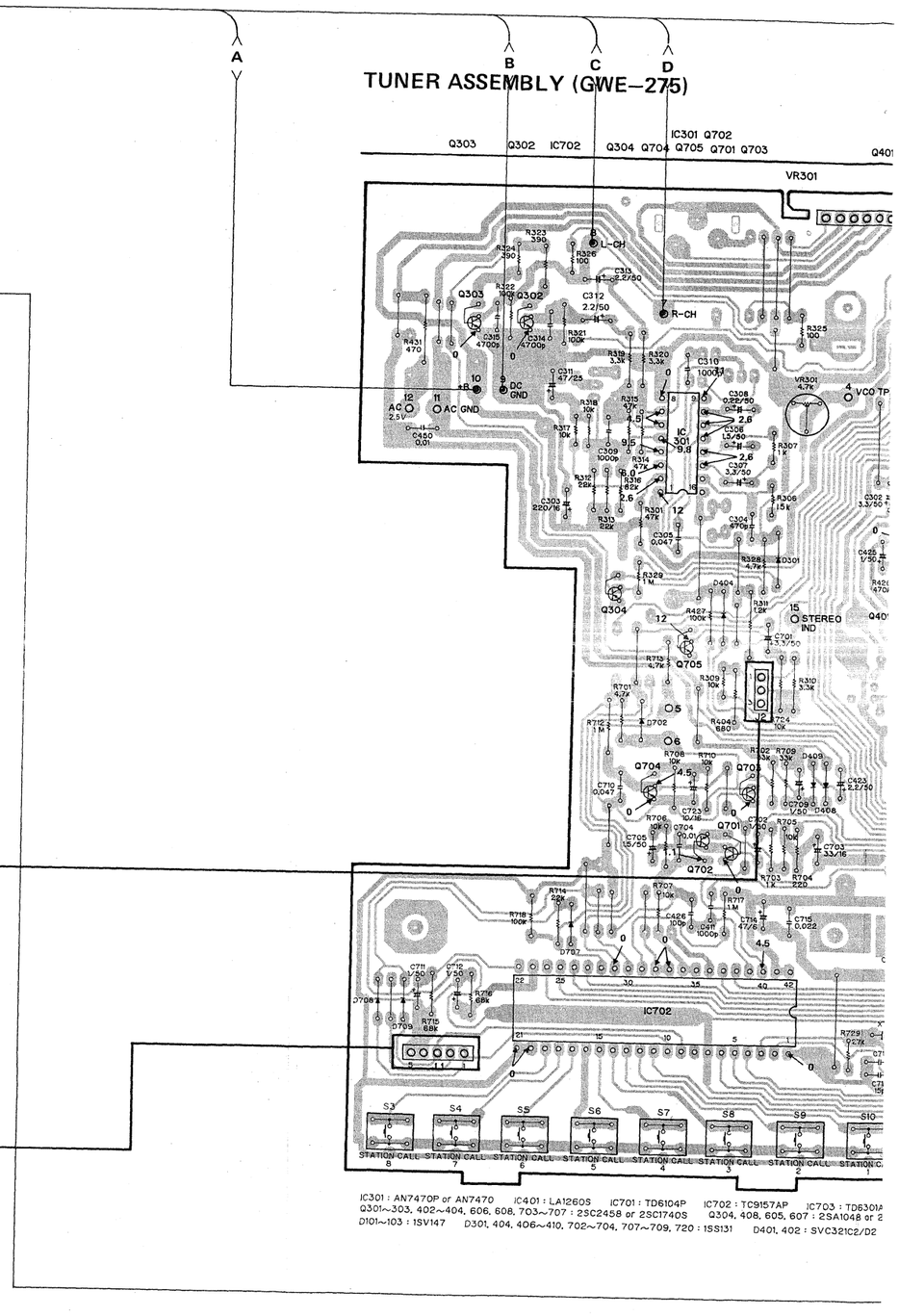
3. P. C. BOARDS CONNECTION DIAGRAM



IC901	MC13020P	D902	ISS131
		D903	RD9.1EB (HZ9.1EB)
Q901	2SC2668		
Q902,903, 905-908, 911	2SC1740S (2SC2603)	TH901	TH103
Q904,910	2SA933S (2SA1115)		
Q909	2SC3400		



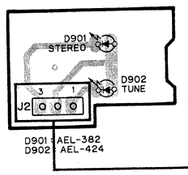




TUNER ASSEMBLY (GWE–275)

AM LOOP ANTENNA ASSEMBLY ATB–102

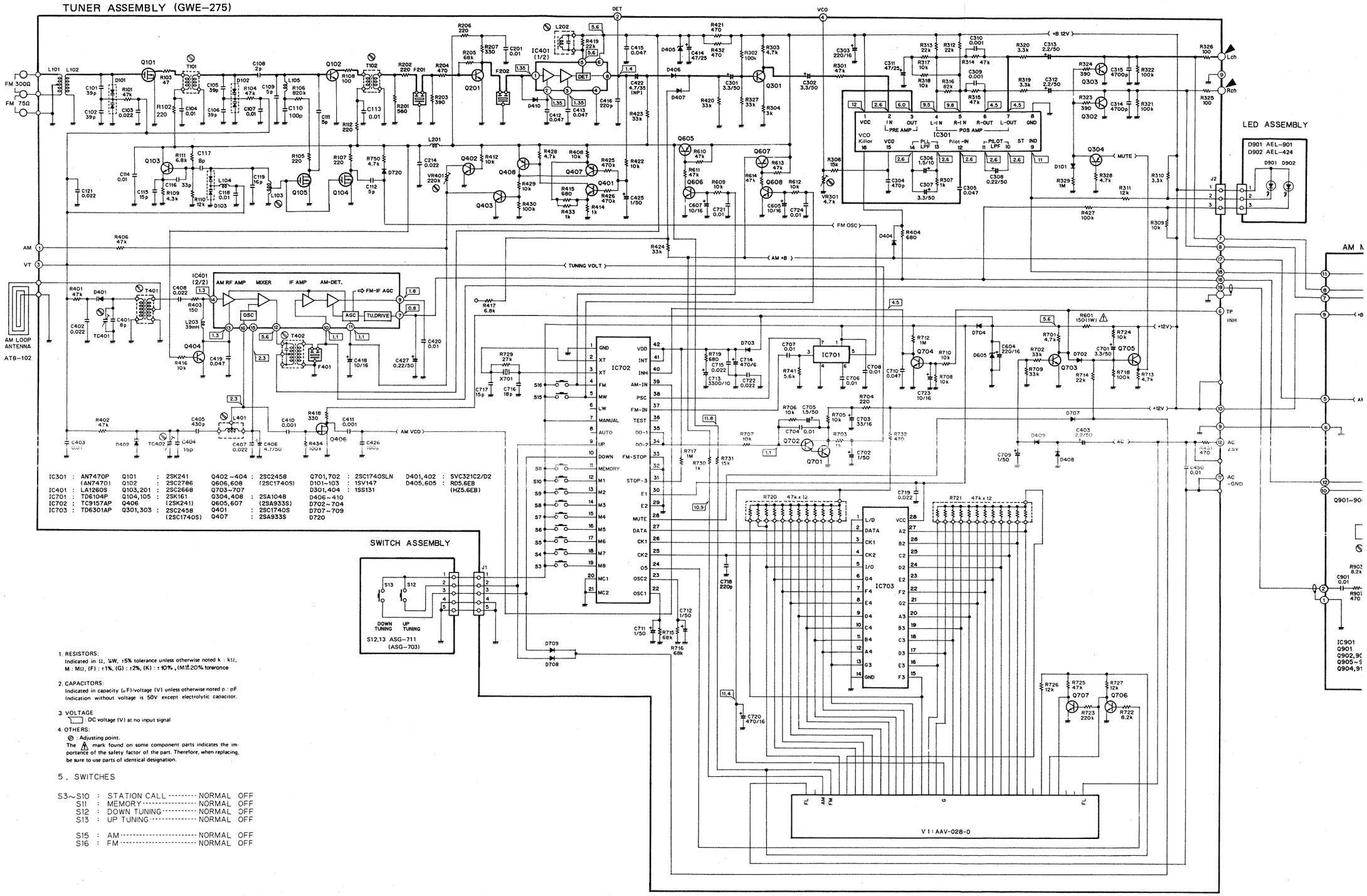
LED ASSEMBLY



IC301 : AN7470P or AN7470 IC401 : LA1260S IC701 : TD6104P IC702 : TC9157AP IC703 : TD6301AP Q101 : 2SK241 Q102 : 2SC2786 Q103, 201 : 2SC2668 Q104, 105, 406 : 2SK161 or 2SK241
Q301~303, 402~404, 606, 608, 703~707 : 2SC2458 or 2SC1740S Q304, 408, 605, 607 : 2SA1048 or 2SA933S Q401 : 2SC1740S Q407 : 2SA933S Q701, 702 : 2SC1740SLN
D101~103 : 1SV147 D301, 404, 406~410, 702~704, 707~709, 720 : 1SS131 D401, 402 : SVC321C2/D2 D405, 605 : RD5.6EB or HZ5.6EB

4. SCHEMATIC DIAGRAM

TUNER ASSEMBLY (GWE-275)



IC301	:	AN7470P (AN7470)	Q101	:	2SK241	Q402~404	:	2SC2458 (2SC1740S)	Q701,702	:	2SC1740SLN
IC401	:	LA1260S	Q102	:	2SC2786	Q606,608			D101~103	:	1SV147
IC701	:	TD6106P	Q103,201	:	2SC2668	Q703~707			D301,404	:	1SS131
IC702	:	TC9157AP	Q104,105	:	2SK161 (2SK241)	Q304,408	:	2SA1048 (2SA933S)	D406~410		
IC703	:	TD6301AP	Q406			Q605,607			D702~704		
			Q301,303	:	2SC2458 (2SC1740S)	Q401	:	2SC1740S	D707~709		
						Q407	:	2SA933S	D720		

D401,402	:	SVC321C2/D2			
D405,605	:	RD5.6EB (HZ5.6EB)			

1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10%, (M)±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

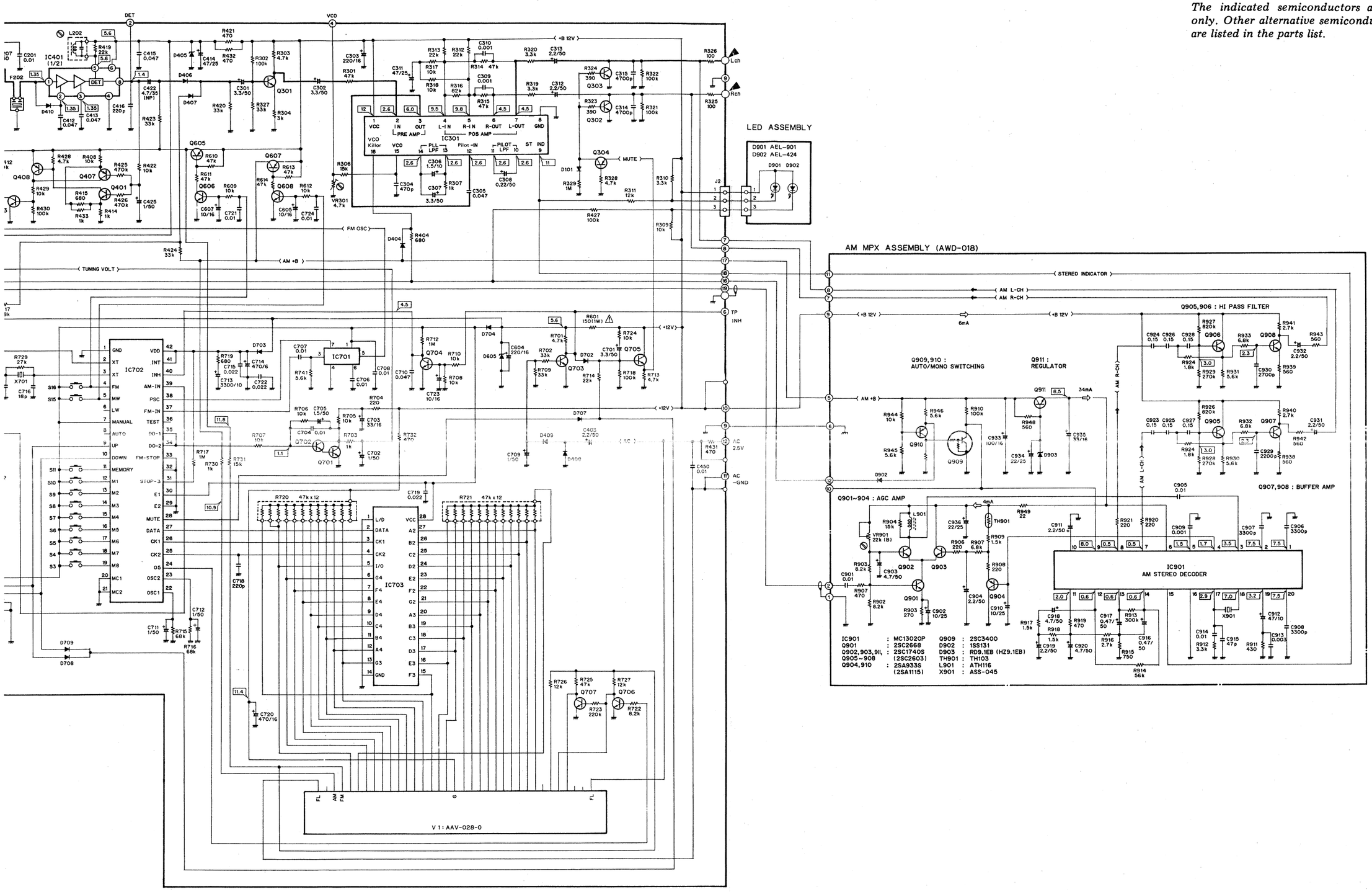
3. VOLTAGE
: DC voltage (V) at no input signal

4. OTHERS:
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

5. SWITCHES

S3~S10	:	STATION CALL	NORMAL	OFF
S11	:	MEMORY	NORMAL	OFF
S12	:	DOWN TUNING	NORMAL	OFF
S13	:	UP TUNING	NORMAL	OFF
S15	:	AM	NORMAL	OFF
S16	:	FM	NORMAL	OFF

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



5. ADJUSTMENTS

■ For servicing these types, please refer to the F-X55ZL (BK) adjustments in service manual (ARP1058: from page 17 to 22) with the exception of this adjustment.

• AM (MW) Tuner Section Adjustment

Step No.	AM SG (400 Hz, 30% modulation)		TX-555ZA (BK) F-X55ZA (BK) tuned frequency display	Adjustment	
	Frequency (kHz)	Level (dB)		Adjustment location	Specifications
1	No input signal		531 kHz	L401	Set pin 3 of tuner assembly to 1.3V (±0.1V).
2			1602 kHz	TC402	Set pin 3 of tuner assembly to 10.0V (±0.3V).
3	Repeat steps 1 and 2 until both specification ratings are satisfied.				
4	603	40	603 kHz	T401	Set the output from pin 1 of the tuner assembly to maximum level.
5	1395	40	1395 kHz	TC401	
6	Repeat steps 4 and 5 until both specification ratings are satisfied.				
7	———	100	———	VR901*	Set the output level of AM MPX assembly to -16.5 dB ±1 dB.
8	1395	Variable	1395 kHz	Check that the TUNING indicator comes on when the AM SG level is gradually increased.	

*VR901 is in AM MPX assembly (AWD-018) (See Fig. 5-1)

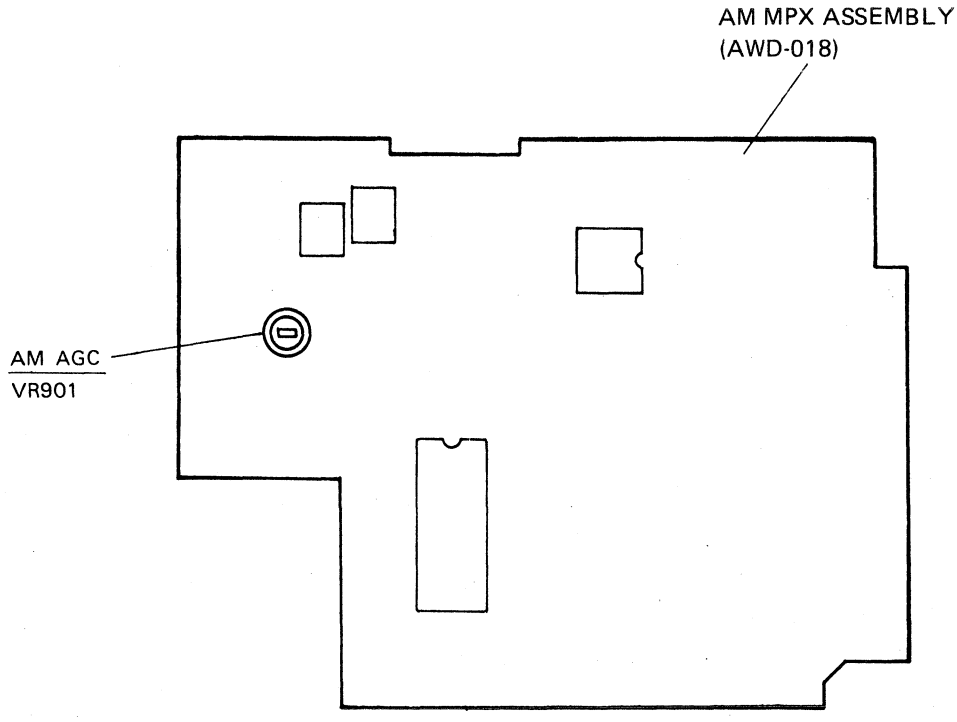


Fig. 5-1 Adjustment position

PIONEER®

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS

ORDER NO.
ARP1058-0

FM/AM DIGITAL SYNTHESIZER TUNER

F-X55ZL(BK)
F-X55ZL

● MODELS F-X55ZL (BK), F-X55Z (BK), F-X55ZA (BK) AND F-X55ZL COME IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Applicable model				Power requirement	Export destination
	F-X55ZL	F-X55ZL(BK)	F-X55Z(BK)	F-X55ZA(BK)		
ZEB	○	○	—	—	(DC power supply)	European continent and United Kingdom
ZUC	—	—	○	—	(DC power supply)	U.S.A and Canada
Z	—	—	○	—	(DC power supply)	European continent
ZEZ	—	—	○	—	(DC power supply)	West Germany
ZP	—	—	—	○	(DC power supply)	Australia

- This service manual is applicable to the ZEB type.
- **As to the F-X55Z (BK)/ZUC and Z, please refer to the additional service manual (ARP1059).**
- F-X55ZL is the same as the F-X55ZL (BK) except for the exterior design (color).
- F-X55ZL is silver version of F-X55ZL (BK).
- The AM tuner of the F-X55ZL (BK) is a two wave-band tuner with MW (medium wave) and LW (long wave), but the F-X55Z (BK) is MW only.
- As to the F-X55Z (BK)/ZEZ type, please refer to the additional service manual (ARP1060).
- As to the F-X55ZA (BK)/ZP type, please refer to the additional service manual (ARP1061).
- Model F-X55ZA (BK) has the same configuration as model F-X55ZL (BK) except that the former equipped with AM stereo circuitry rather than LW (long wave) circuitry.
- **Ce manuel d'instruction se refère au mode de réglage en français.**
- **Este manual de servicio trata del método ajuste escrito en español.**

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CONTENTS

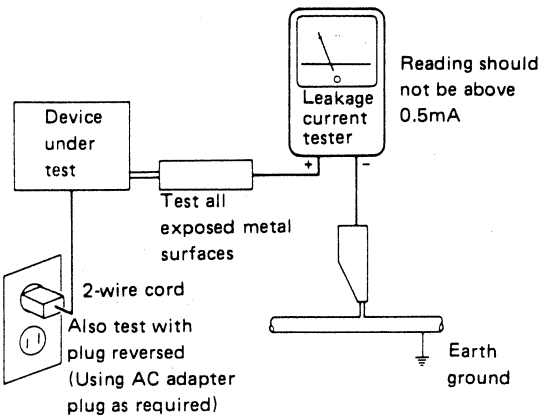
1. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. SPECIFICATIONS

FM Tuner Section

Frequency range ..... 87.5 MHz to 108 MHz
Usable Sensitivity ..... 11.2 dBf, IHF (1.0 μV/75 ohms)
Sensitivity (DIN) ..... Mono: 0.9 μV/75 ohms
Stereo: 31.5 μV/75 ohms
Signal-to-Noise Ratio (IHF, 85 dBf Input) ..... Mono: 77 dB
Stereo: 73 dB
Signal-to-Noise Ratio (DIN) ..... Mono: 66 dB
Stereo: 60 dB
Distortion ..... Stereo: 0.4% (1 kHz)
Alternate Channel Selectivity ..... 67 dB (400 kHz)
Stereo Separation ..... 40 dB (1 kHz)
Antenna Input ..... 300 ohm balanced
75 ohm unbalanced

MW (AM) Tuner Section

Frequency range ..... 530 kHz to 1600 kHz when 10 kHz step
531 kHz to 1602 kHz when 9 kHz step
Sensitivity (IHF, Loop antenna) ..... 300 μV/m
Signal-to-Noise Ratio ..... 50 dB
Antenna ..... Loop Antenna

LW Tuner Section (For LW-equipped models only)

Frequency range ..... 153 kHz to 281 kHz

Miscellaneous

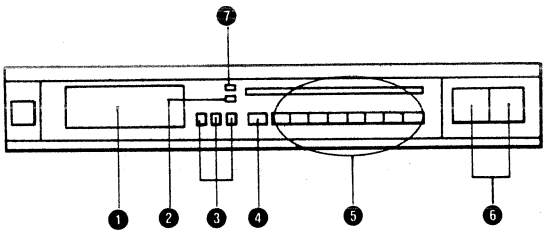
Dimensions ..... 360(W) x 56(H) x 215(D) mm
14-3/16(W) x 2-3/16(H) x 8-7/16(D) in
Weight (without package) ..... 1.8 kg (4 lb)

Furnished Parts

FM T-type Antenna 1
AM Loop Antenna 1
Tuner input/output cord 1

NOTE:
Specifications and the design subject to possible modifications without notice due to improvements.

3. PANEL FACILITIES



NOTE:
The illustration is of the model for use in continental Europe and the U.K.

❶ FREQUENCY display

Permits reading the received frequency at a glance from the displayed figure. The FM band is indicated by MHz, and the AM (MW or LW) band by kHz.

❷ STEREO indicator

This lights when a stereo program has been picked up during an FM broadcast.

❸ FUNCTION switch

MW: Push to receive MW band broadcasts.
LW: Push to receive LW band broadcasts.
FM: Push to receive FM band broadcasts.

Only AM/FM switching is available for the other models.

❹ MEMORY switch

Push to operate the memory circuit. After the switch is pressed, the memory circuit will function for about ten seconds. During this time, press one of the STATION CALL switches to memorize the station being currently received. If more than ten seconds elapse after the MEMORY switch is pressed, no stations can be memorized. In this case, press the MEMORY switch again if you wish to memorize a station.

❺ STATION CALL switches

These are used to preset and recall broadcasting stations. A total of 16 stations can be preset [FM: 8, AM (MW or LW): 8].

- To tune in to a prememorized station, push the appropriate STATION CALL switch.
- Once the stations have been preset, all you have to do to recall them is push the STATION CALL switch.

❻ TUNING switches

These are used to locate the stations. Push either of these two switches; the left switch "−" to go to a lower, and the right switch "+" to go to a higher frequency.

❼ TUNED indicator

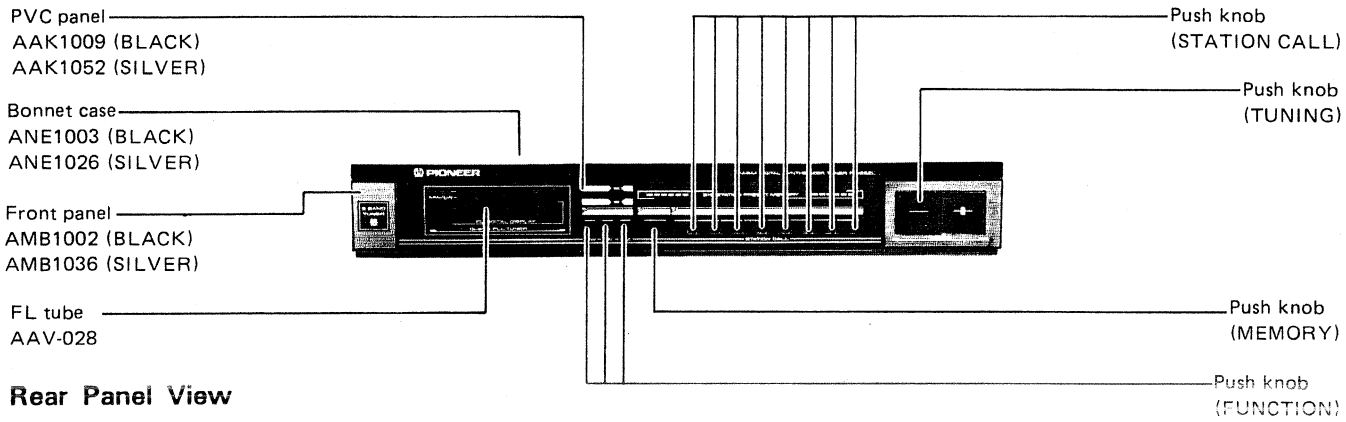
This lights to indicate when the finest tuning of a station has been achieved.

4. PARTS LOCATION

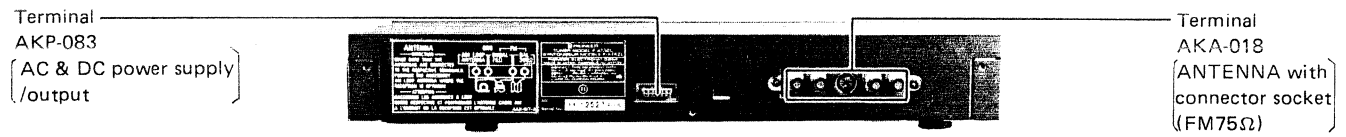
NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

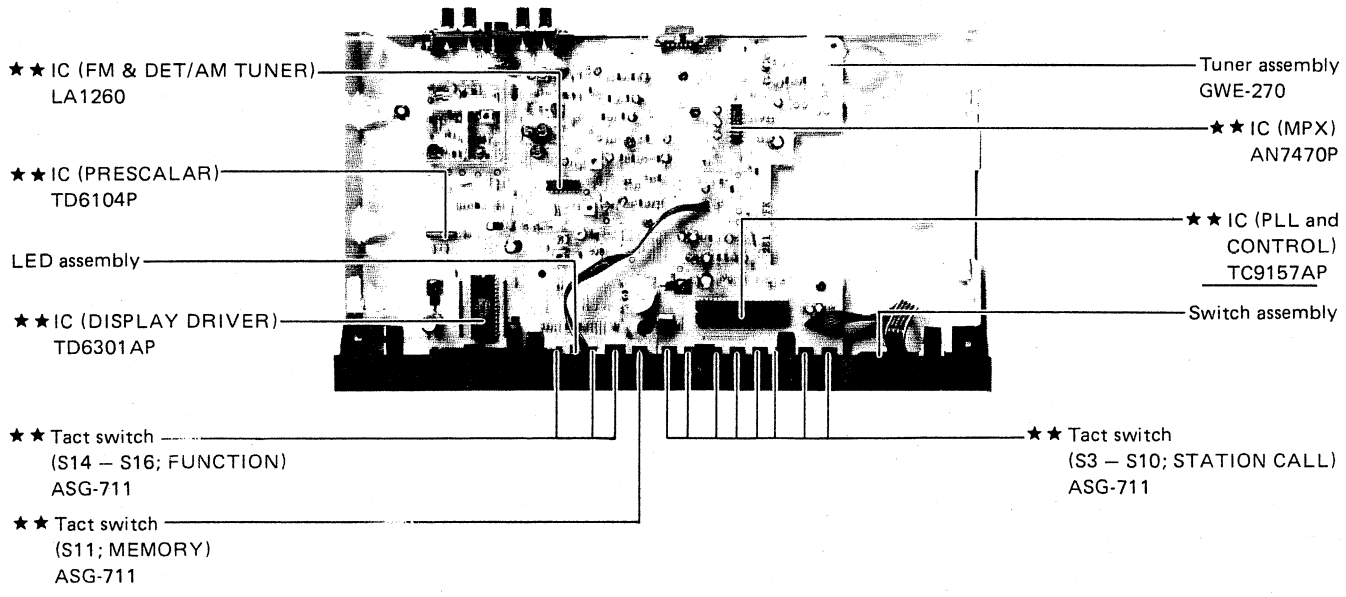
Front Panel View



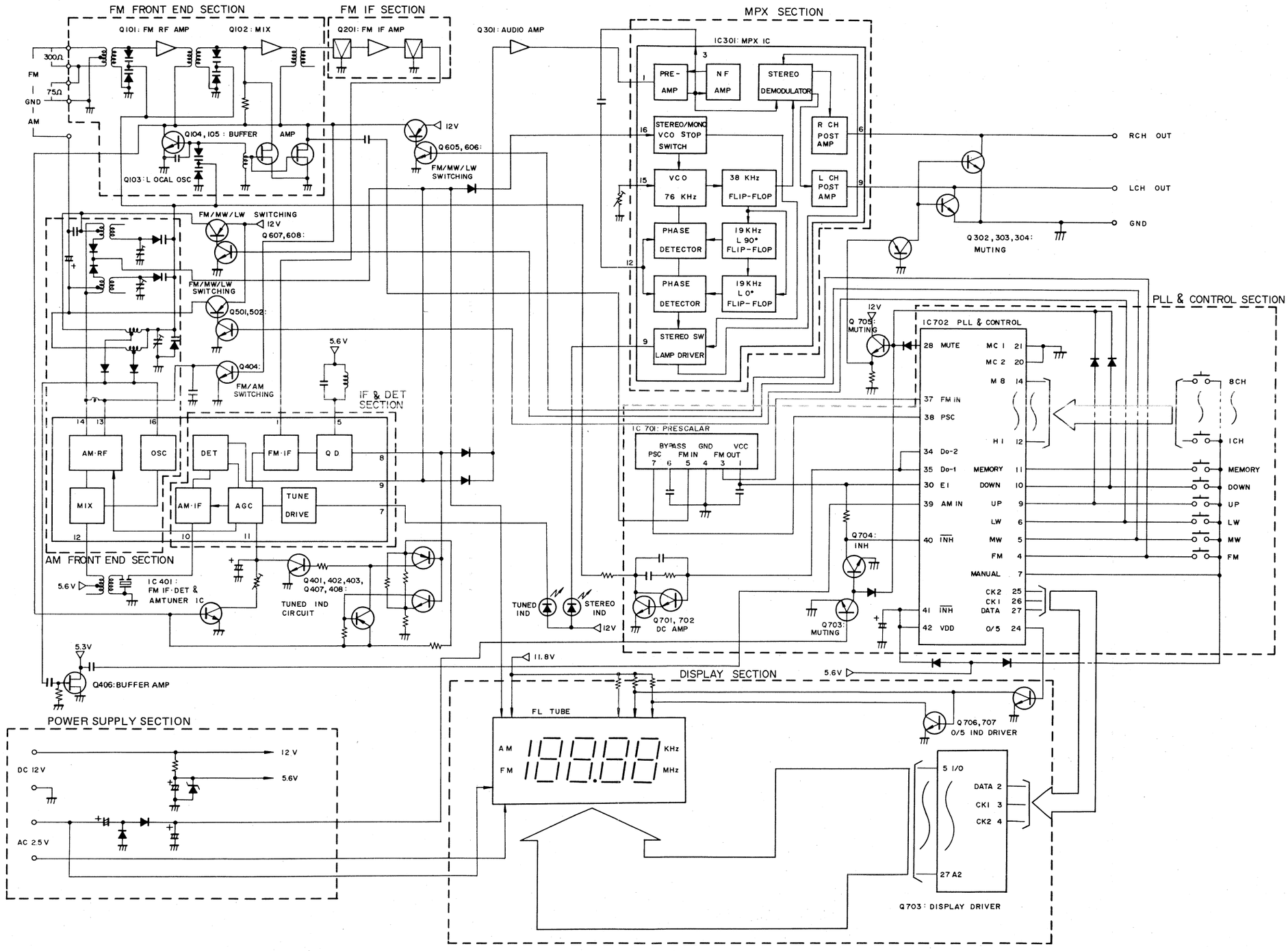
Rear Panel View



Top View



5. BLOCK DIAGRAM



6. IC DESCRIPTION

- IC (LA1260) PIN DESCRIPTION

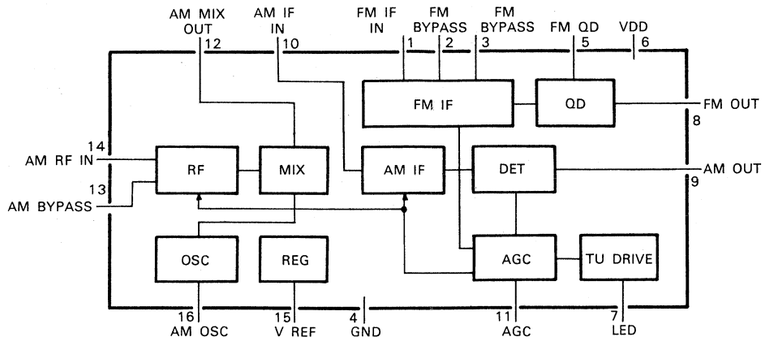


Fig. 6-1 LA1260 Block diagram

Pin No.	Pin Name	Pin No.	Pin Name
1	FM-IF input	9	AMDET output
2	FM bypass capacitor connection	10	AM-IF input
3		11*2	AM mix output
4	GND	12*3	AM mix output
5	FM DET coil connection	13*4	AM bypass capacitor connection
6	VCC	14	AM RF input
7*1	LED drive terminal (TUNED)	15	Regulator outpur
8	FM DET output	16	AM OSC connection

*1: Active low.
*2: TUNED IND cannot be driven when the voltage of this pin becomes less than 0.9V. Accordingly, LED does not light up.
*3: Pin (12) is turned to FM when it is opened. When the electric potential of pin (12) is made the same as pin (6) by direct current, the AM circuit is switched ON by the internal switch.
*4: Pin (13) is turned to AM when it is opened. When pin (13) is grouded, the FM circuit is switched ON by the internal switch and AM circuit is switched OFF. At this time, pin (12) is connected in the same electric potential with pin (6).

- IC (AN7470P) PIN DESCRIPTION

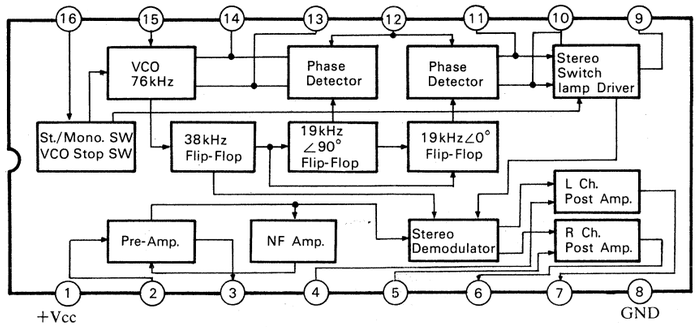


Fig. 6-2 AN7470P Block diagram

Pin No.	Pin Name	Pin No.	Pin Name
1	VCC	9*1	Stereo Indicator and VCO Freq. Monitor
2	Composite Sig. Input		
3	Buffer Amp. Output	10, 11	Pilot Det. Low-pass Filter
4	L Ch. Amp. Feedback	12	Pilot Signal Input
5	R Ch. Amp. Feedback	13	PLL Low-pass Filter
6	R Ch. Amp. Output	14	PLL Low-pass Filter
7	L Ch. Amp. Output	15	VCO RC Time Const
8	GND	16*2	Forced Mono. VCO Killer

*1: Active low.
*2: VMO: ST-MONO switching voltage
VVCO: VCO stop voltage

① STEREO-MONO automatic switching
② Compulsony MONO
③ VCO stop

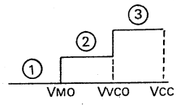
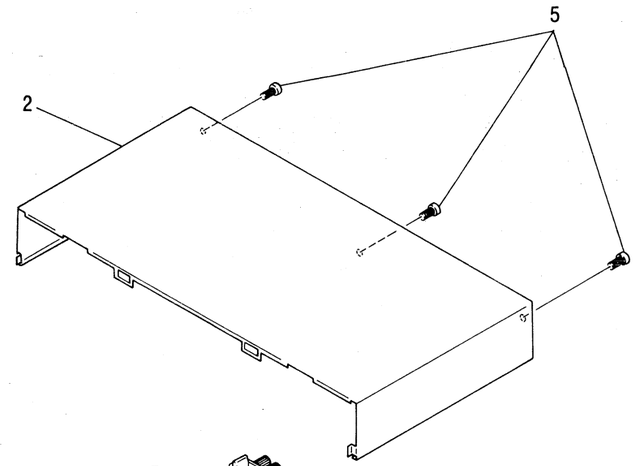
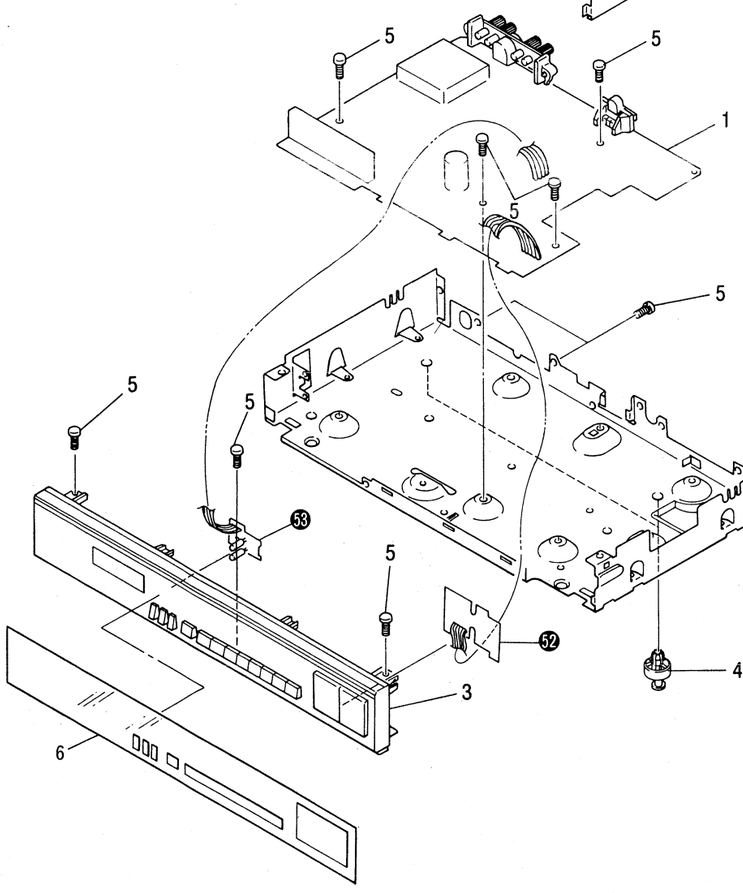


Fig. (a) Input applied to pin (16) of AN7470P

7. EXPLODED VIEW





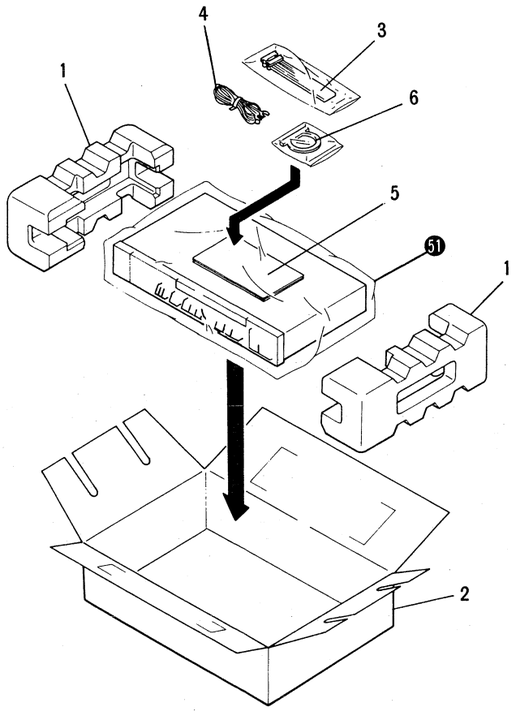
NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Parts List of Exploded View

Mark	No.	Part No.	Description
	1.	GWE-270	Tuner assembly
	2.	ANE1003	Bonnet case (BLACK)
		ANE1026	Bonnet case (SILVER)
	3.	AMB1002	Front panel (BLACK)
		AMB1036	Front panel (SILVER)
	4.	AMR1002	Leg assembly
	5.	BBZ30P080FZK	Screw
	6.	AAK1009	PVC panel (BLACK)
		AAK1052	PVC panel (SILVER)
	51.		Chassis
	52.		Switch assembly
	53.		LED assembly

8. PACKING

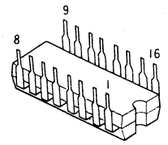


Parts List

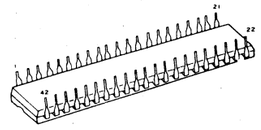
Mark	No.	Part No.	Description
	1.	AHA-376	Side pad
	2.	AHD1008	Packing case (BLACK)
		AHD1043	Packing case (SILVER)
	3.	ADE-088	Connection cord
	4.	ADH-005	FM antenna
	5.	ARH-051	Supplementary instructions
	6.	ATB-102	Loop antenna assembly
	51.		Vinyl sheet

External Appearance of Transistors and ICs

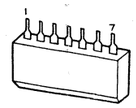
AN7470P
AN7470
LA1260



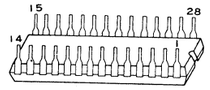
TC9157AP



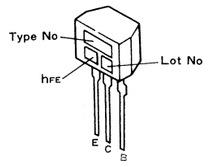
TD6104P



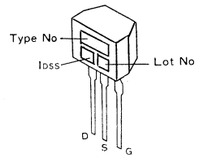
TD6301AP



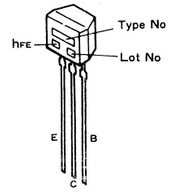
2SA933S
2SC1740S
2SC2668



2SK161-Y
2SK241-Y

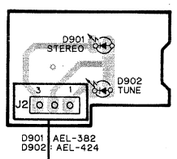


2SC2786-L

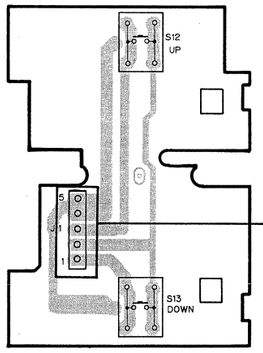


9. P. C. BOARDS CONNECTION DIAGRAM

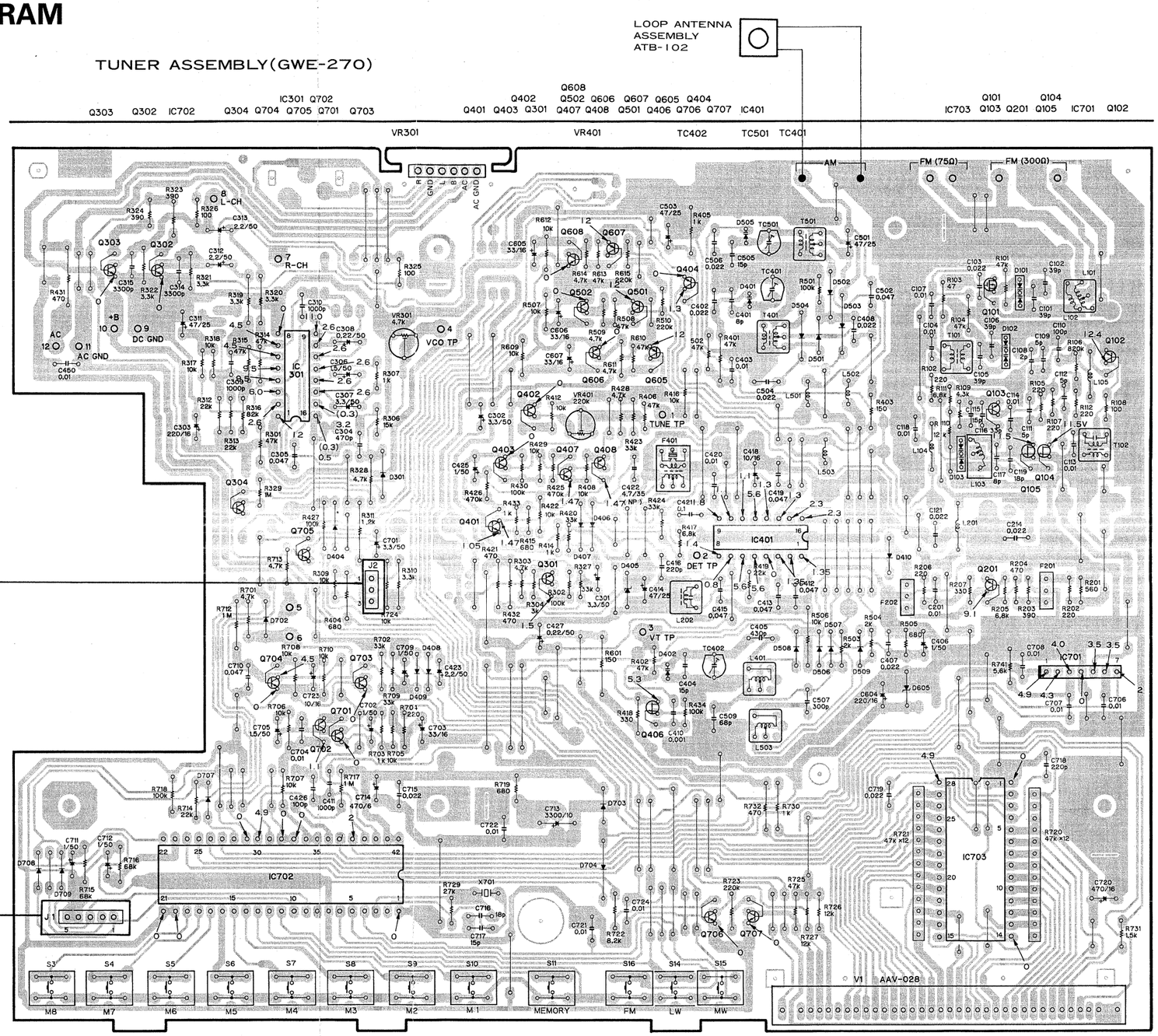
LED ASSEMBLY



SWITCH ASSEMBLY

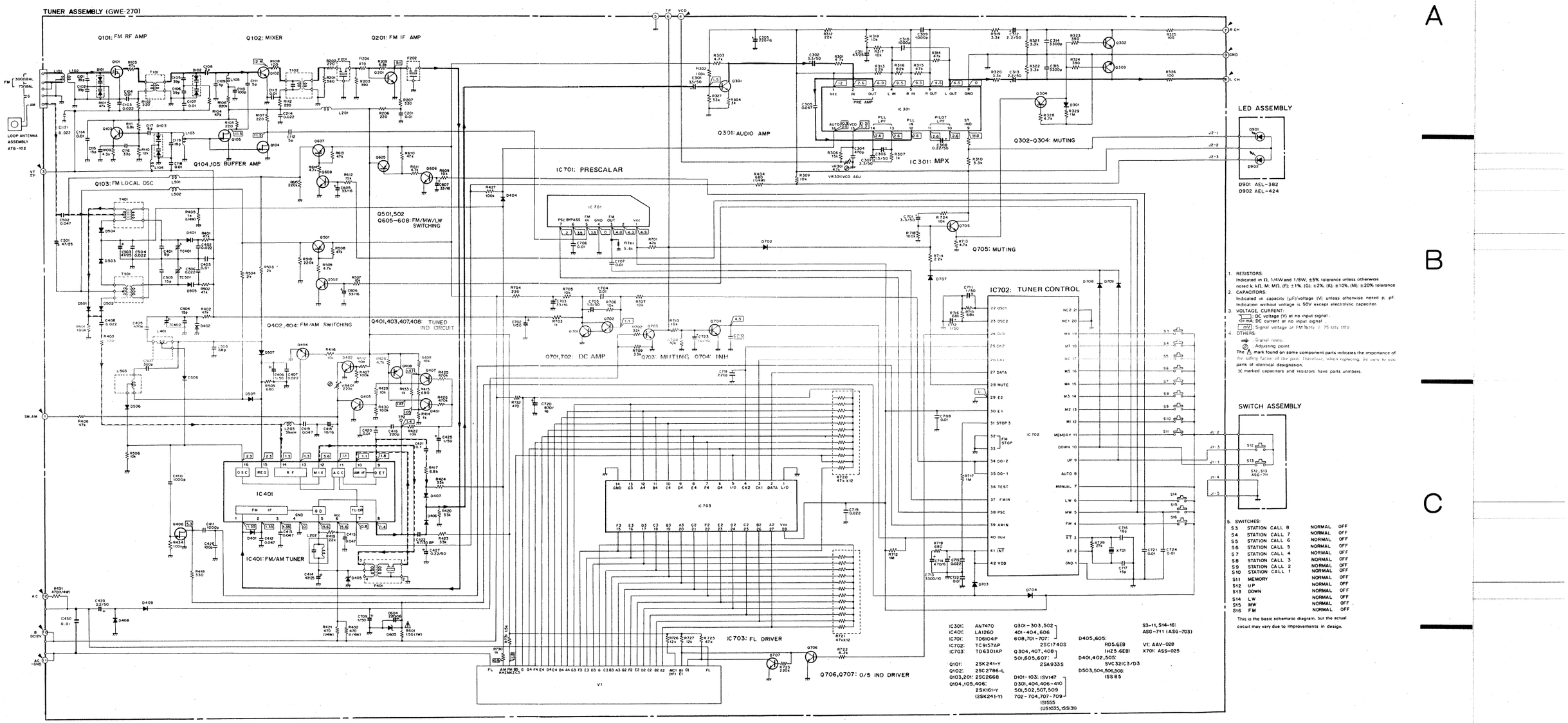


TUNER ASSEMBLY(GWE-270)



IC301 : AN7470P (AN7470) IC401 : LA1260S IC701 : TD6104P IC702 : TC9157AP IC703 : TD6301AP Q101 : 2SK241 Q102 : 2SC2786 Q103, 201 : 2SC2668 Q104, 105, 406 : 2SK161 (2SK241) Q301~303, 401~404, 502, 606, 608, 701~707 : 2SC1740S
Q304, 407, 408, 501,605, 607 : 2SA933S
D101~103 : 1SV147 D301, 404, 406~410, 501, 502, 507, 509, 702~704, 707~709 : 1SS131 (US1035) D401, 402, 505 : SVC321C3/D3 D405, 605 : RD5.6EB (HZ5.6EB) D503, 504, 506, 508 : MA859

10. SCHEMAIC DIAGRAM



1. RESISTORS:
Indicated in Ω, 1/4W and 1/8W, ±5% tolerance unless otherwise noted k: kΩ, M: MΩ, (F): ±1%, (G): ±2%, (K): ±10%, (M): ±20% tolerance
2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p: pF. Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE, CURRENT:
(V): DC voltage (V) at no input signal.
(0 mA): DC current at no input signal.
(mV): Signal voltage at FM 1kHz ± 75 kHz DEV
4. OTHERS:
: Signal route.
: Adjusting point
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
X marked capacitors and resistors have parts numbers.

5. SWITCHES:

S3	STATION CALL 8	NORMAL	OFF
S4	STATION CALL 7	NORMAL	OFF
S5	STATION CALL 6	NORMAL	OFF
S6	STATION CALL 5	NORMAL	OFF
S7	STATION CALL 4	NORMAL	OFF
S8	STATION CALL 3	NORMAL	OFF
S9	STATION CALL 2	NORMAL	OFF
S10	STATION CALL 1	NORMAL	OFF
S11	MEMORY	NORMAL	OFF
S12	UP	NORMAL	OFF
S13	DOWN	NORMAL	OFF
S14	LW	NORMAL	OFF
S15	MW	NORMAL	OFF
S16	FM	NORMAL	OFF

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

IC301:	AN7470	Q301-303,502	S3-11,S14-16:
IC401:	LA1260	401-404,606	ASG-711 (ASG-703)
IC701:	TD6104P	608,701-707:	
IC702:	TC9157AP	2SC1740S	V1: AAV-028
IC703:	TD6301AP	Q304,407,408:	X701: ASS-025
		501,605,607:	D405,605:
Q101:	2SK241-Y	2SA933S	RD5.6EB
Q102:	2SC2786-L		(wZ5.6EB)
Q103,201:	2SC2668	D101-103: 1SV147	D401,402,505:
Q104,105,406:	2SK161-Y	D301,404,406-410	SVC321C3/D3
	(2SK241-Y)	501,502,507,509	D503,504,506,508:
		702-704,707-709:	1SS85
		1SI555	
		(US1035,1SS131)	

11. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 × 10¹*	*561*	*RD1/4PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN1/4SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Miscellaneous Parts

Mark	Symbol & Description	Part No.
	Tuner assembly	GWE-270
	Switch assembly	Non supply
	LED assembly	Non supply

Tuner assembly (GWE-270)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC301	AN7470P (AN7470)
★★	IC401	LA1260
★★	IC702	TC9157AP
★★	IC701	TD6104P
★★	IC703	TD6301AP
★★	Q304, Q407, Q408, Q501, Q605, Q607	2SA933S
★★	Q301 – Q303, Q401 – Q404, Q502, Q606, Q608, Q701 – Q707	2SC1740S
★★	Q102	2SC2786-L
★★	Q103, Q201	2SC2668
★★	Q104, Q105, Q406	2SK161-Y (2SK241-Y)
★	Q101	2SK241-Y
★	D503, D504, D506, D508	MA859
★	D405, D605	RD5.6EB (HZ5.6EB)
★	D401, D402, D505	SVC321C3/D3
★	D301, D404, D406 – D410, D501, D502, D507, D509, D702 – D704, D707 – D709	1SS131 (US1035)
★	D101 – D103	1SV147

SWITCHES

Mark	Symbol & Description	Part No.
★★	S3 – S11, S14 – S16 Tact switch (FUNCTION, MEMORY, STATION CALL)	ASG-711 (ASG-703)

COILS, TRANSFORMERS, AND FILTERS

Mark	Symbol & Description	Part No.
	L401 AM OSC coil	ATB-100
	L101 FM ANT coil	ATC-192
	L102 FM ANT coil	ATC-193
	L103 FM OSC coil	ATC-214
	L503 LW OSC coil	ATD-023
	L202 FM DET coil	ATE-072
	L501, L502 Inductor	ATH-108
	L203 Inductor	ATH-116
	L104, L105, L201 Inductor	ATH-049
	T401 AM ANT transformer	ATB-099
	T101 FM RF transformer	ATC-194
	T501 LW ANT transformer	ATD-027
	T102 FM matching transformer	ATE-063
	F202 FM ceramic filter	ATF-107
	F201 FM ceramic filter	ATF-119
	F401 AM ceramic filter	ATF-133

CAPACITORS

Mark	Symbol & Description	Part No.
	C713 (3300/10V)	ACH-389
	TC401, TC402 Trimmer	ACM-015
	TC501 Trimmer	ACM-020
	C716	CCCCH180J50 (CCDCH180J50)
	C509	CCCCH680J50 (CCDCH680J50)
	C416, C718	CCCSL221J50 (CCDSL221J50)
	C117, C401	CCDCH080D50
	C115, C404, C505, C717	CCDCH150J50
	C116	CCDCH330J50
	C101, C102, C105, C106	CCDRH390J50
	C108	CCDSL020C50
	C109, C111, C112	CCDSL050C50
	C110, C426	CCDSL101J50
	C119	CCDTH180J50
	C422	CEANP4R7M35
	C308, C427	CEASR22M50
	C406, C425, C702, C709, C711, C712	CEAS010M50L
	C306, C705	CEAS1R5M50
	C418, C723	CEAS100M16
	C312, C313, C423	CEAS2R2M50
	C303, C604	CEAS221M16
	C301, C302, C307, C701	CEAS3R3M50
	C605 – C607, C703	CEAS330M16
	C311, C414, C501, C503	CEAS470M25
	C720	CEAS471M16
	C714	CEAS471M6
	C309, C310, C410, C411	CKCYB102K50 (CKDYB102K50)
	C314, C315	CKCYB332K50 (CKDYB332K50)
	C305, C412, C413, C419, C502, C710	CKCYF473Z50 (CKDYF473Z50)
	C415	CKCYX473M25 (CKDYX473M25)
	C104, C107, C113, C114, C118, C201, C403, C420, C450, C704, C706 – C708, C721, C722, C724	CKDYF103Z50
	C103, C121, C214, C402, C407, C408, C504, C506, C715, C719	CKDYF223Z50
	C421	CQMA104J50
	C507	CQSA301J50
	C405	CQSA431J50
	C304	CQSA471J50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
★	VR401	Semi-fixed (220kΩ)	VRTB6VS224
★	VR301	Semi-fixed (4.7kΩ)	VRTB6VS472
⚠	R601		RS1LMF151J
	R720, R721		RA12S473J
	R404, R405, R421, R431, R432		RD1/4PM□□□J
	Other resistors		RD1/8PM□□□J

OTHERS

Mark	Symbol & Description		Part No.
		Terminal (ANTENNA with connector socket (FM75Ω))	AKA-018
⚠ ★		Terminal (AC and DC power supply/output)	AKP-083
★	V1	Fluorescent tube	AAV-028
★	X701	Crystal resonator	ASS-025

Switch Assembly

SWITCHES

Mark	Symbol & Description	Part No.
★★	S12, S13 Tact switch (TUNING+, TUNING–)	ASG-711 (ASG-703)

LED Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★	D901 LED	AEL-382
★	D902 LED	AEL-424

12. ADJUSTMENT

FM Tuner Section Adjustment

- Connect up as indicated in Fig. 12-1.
- Press the FM key to set FM mode.

Note: Stereo modulation: Main 1 kHz L+R ± 68.25 Hz dev.
Pilot 19 kHz ± 6.75 kHz dev.

Step No.	FM SG (1kHz ± 75kHz dev.)			F-X55ZL(BK) (F-X55ZL) tuned frequency display	Adjustment	
	Frequency (MHz)	Level (dB)			Adjustment location	Specifications
1	No input signal			87.5 MHz	—	Check pin 3 (3.4V ± 1.5V) of tuner assembly.
2				108.0 MHz	—	Check pin ($8.7V^{+2.5}_{-2.0}V$) of tuner assembly.
3	98.0	20–30		98.0 MHz	T101, T102	Set the output from pin 1 of the tuner assembly to maximum level. (Before performing the adjustment of Step 3, turn VR401 fully counterclockwise.)
4	98.0	60	No modulation	98.0 MHz	L202	Set pin 2 of tuner assembly to 1.4V (±0.01V).
5	98.0	80		98.0 MHz	VR401	Set pin 1 of tuner assembly to 1.1V (±0.01V).
6	98.0	0		98.0 MHz	—	Check pin 1 of tuner assembly below 0.8V.
7	98.0 / No modulation	80		98.0 MHz	VR301	Adjust the frequency at pin 4 of tuner assembly to 76kHz (± 150 Hz).
8	98.0 / Stereo modulation (note)	60		98.0 MHz	T102	Minimize distortion in both left and right channel outputs (adjust T102 to within ±90°).
9	98.0 / Stereo modulation (note)	Variable		98.0 MHz	Confirm that the TUNED IND and STEREO IND light up when the level of FM SG is turned to high, and that the TUNED IND and STEREO IND light off when the level of the FM SG is turned to low.	

AM (MW) Tuner Section Adjustment

- Connect up as indicated in Fig. 12-2.
- Press the AM (MW) key to set AM (MW) mode.
- Set the AM CHANNEL STEP switch to the 9 kHz position. (F-X55Z(BK)/ZUC, Z model only)

Step No.	AM SG (400Hz, 30% modulation)		F-X55ZL(BK) (F-X55ZL) tuned frequency display	Adjustment	
	Frequency (kHz)	Level (dB)		Adjustment location	Specifications
1	No input signal		531 kHz	L401	Set pin 3 of tuner assembly to 1.3V (±0.1V).
2			1602 kHz	TC402	Set pin 3 of tuner assembly to 10.0V (±0.3V).
3	Repeat steps 1 and 2 until both specification ratings are satisfied.				
4	603	40	603 kHz	T401	Set the output from pin 1 of the tuner assembly to maximum level.
5	1395	40	1395 kHz	TC401	
6	Repeat steps 4 and 5 until both specification ratings are satisfied.				
7	1395	Variable	1395 kHz	Check that the TUNING indicator comes on when the AM SG level is gradually increased.	

AM (LW) Tuner Section Adjustment (F-X55ZL(BK), F-X55ZL/ZEB model only)

- Connect up as indicated in Fig. 12-2.
- Press the AM (LW) key to set AM (LW) mode.

Step No.	AM SG (400Hz, 30% modulation)		F-X55ZL(BK) (F-X55ZL) tuned frequency display	Adjustment	
	Frequency (kHz)	Level (dB)		Adjustment location	Specifications
1	No input signal		281 kHz	L503	Set pin 3 of tuner assembly to 5.2V (±0.1V).
2	164	40	164 kHz	T501	Set the output from pin 1 of the tuner assembly to maximum level.
3	254	40	254 kHz	TC401	
4	Repeat steps 2 and 3 until both specification ratings are satisfied.				

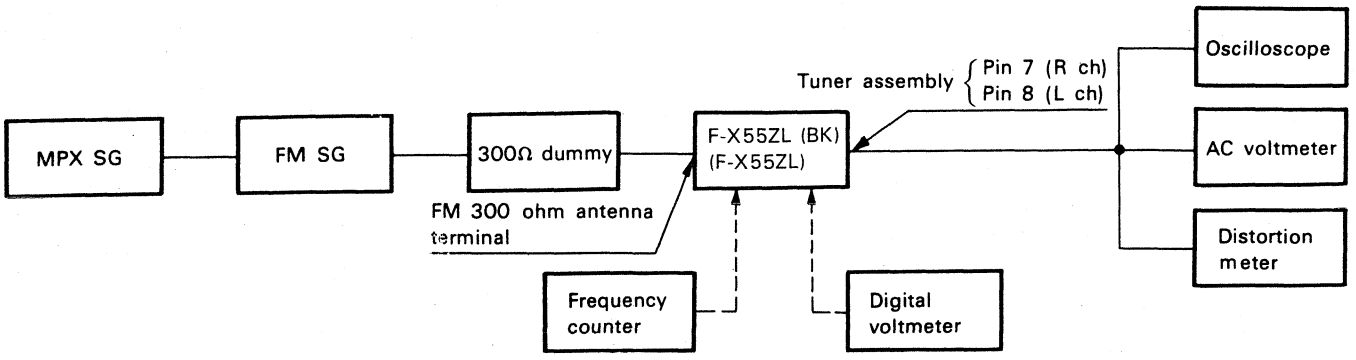


Fig. 12-1 FM adjustment connection diagram

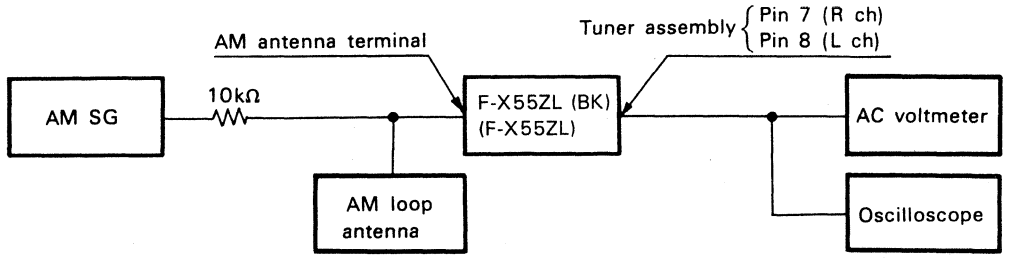


Fig. 12-2 AM adjustments connection diagram

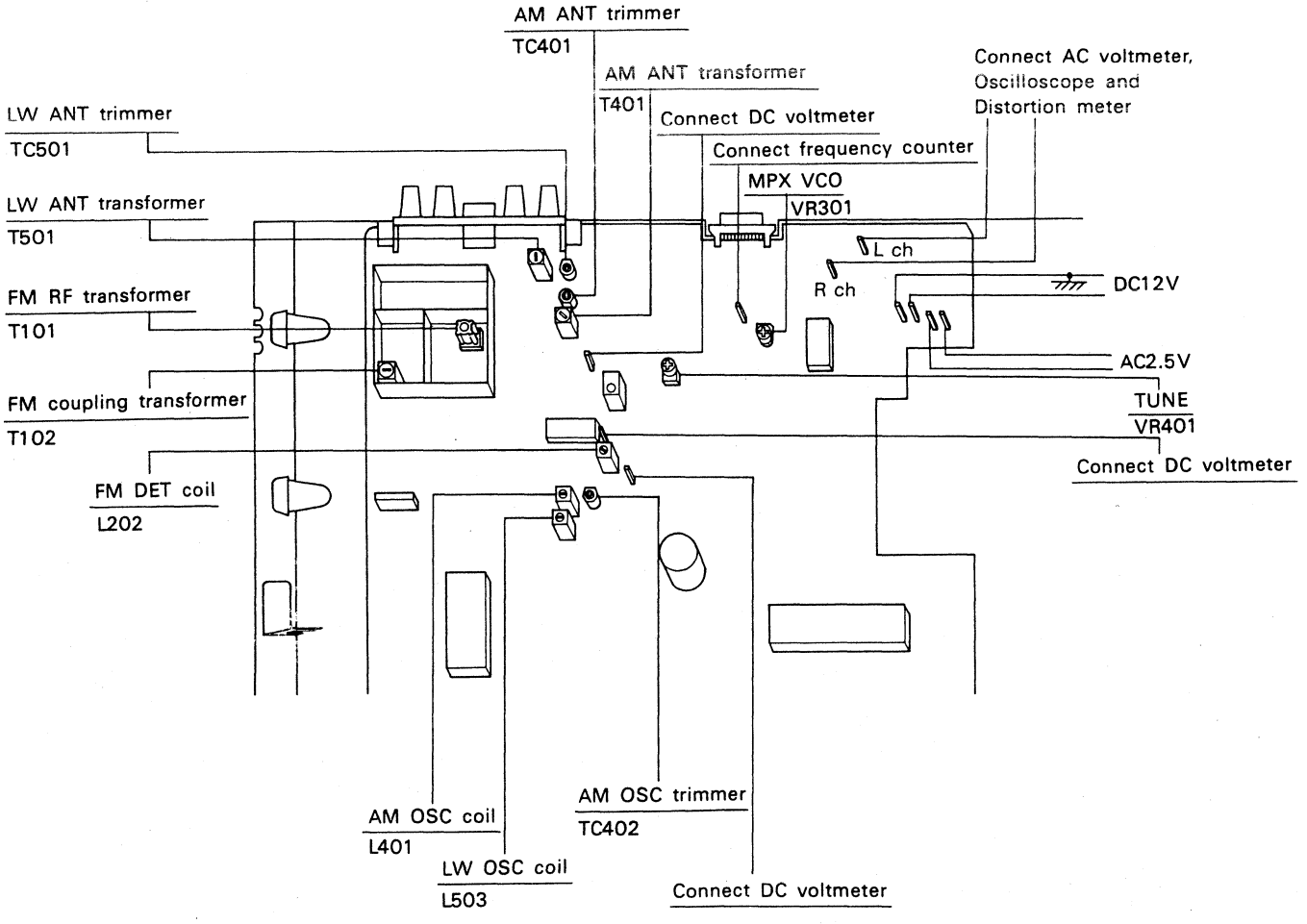


Fig. 12-3 Adjustment positions

12. RÉGLAGE

Réglage de la partie syntoniseur MF

- Faire les raccordements comme indiqué en Fig. 12-1.
- Enfoncer la touche MF pour régler en mode MF.

Note: Modulation stéréo: Principal 1kHz L+R ± 68,25kHz dév.
Pilote 19kHz ± 6,75kHz dév.

Etape N°	FM SG (1kHz ± 75kHz dév.)			Affichage de fréquence syntonisée F-X55ZL(BK) (F-X55ZL)	Réglage	
	Fréquence (MHz)	Niveau (dB)			Lieu de réglage	Caractéristiques
1	Pas de signal d'entrée			87,5 MHz	—	Vérifier la fiche 3 (3,4V ± 1,5V) de l'ensemble syntoniseur.
2				108,0 MHz	—	Vérifier la fiche 3 ($8,7V^{+2,5}_{-2,0}V$) de l'ensemble syntoniseur.
3	98,0	20 à 30		98,0 MHz	T101, T102	Régler la puissance de la fiche 1 de l'ensemble syntoniseur au niveau maximal. (Avant d'effectuer le réglage de l'Etape 3, tourner VR401 à fond dans le sens horaire inversé)
4	98,0	60	Pas de modulation	98,0 MHz	L202	Régler la fiche 2 de l'ensemble syntoniseur à 1,4V(±0,01V).
5	98,0	80		98,0 MHz	VR401	Set pin 1 of tuner assembly to 1,1V (±0,01V).
6	98,0	0		98,0 MHz	—	Vérifier si la fiche 1 de l'ensemble syntoniseur est endessous de 0,8V.
7	98,0 / Pas de modulation	80		98,0 MHz	VR301	Régler la fréquence de la fiche 4 de l'ensemble syntoniseur à 76 kHz (± 150 Hz).
8	98,0 / Modulation stéréo (Note)	60		98,0 MHz	T102	Réduire la distorsion dans les sorties des deux canaux droit et gauche (régler T102 à ± 90°).
9	98,0 / Modulation stéréo(Note)	Variable		98,0 MHz	Confirmer que le TUNED IND et le STEREO IND s'allument lorsque le niveau de FM SG est syntonisé trop haut, et que le TUNED IND et STEREO IND sont éteints lorsque le niveau de FM SG est syntonisé trop bas.	

Réglage de la partie syntoniseur MA (MW)

- Faire les raccordements comme indiqué en Fig. 12-2.
- Enfoncer la touche MA (MW) pour régler en mode MA (MW).
- Régler le commutateur MA CHANNEL STEP en 9ème position. (F-X55Z(BK)/ZUC, seulement modèle Z)

Etape N°	AM SG (400Hz, 30% modulation)		Affichage de fréquence syntonisée F-X55ZL(BK) (F-X55ZL)	Réglage	
	Fréquence (kHz)	Niveau (dB)		Lieu de réglage	Caractéristiques
1	Pas de signal d'entrée		531 kHz	L401	Régler la fiche 3 de l'ensemble syntoniseur à 1,3V (±0,1V).
2			1602 kHz	TC402	Régler la fiche 3 de l'ensemble syntoniseur à 10,0V (±0,3V).
3	Répéter les Etapes 1 et 2 jusqu'à ce que les taux nominaux préconisés soient atteints.				
4	603	40	603 kHz	T401	Régler la puissance de la fiche 1 de l'ensemble syntoniseur au niveau maximal.
5	1395	40	1395 kHz	TC401	
6	Répéter les Etapes 4 et 5 jusqu'à ce que les taux nominaux préconisés soient atteints.				
7	1395	Variable	1395 kHz	Vérifier si l'indicateur TUNING s'allume lorsque le niveau de AM SG augments graduellement.	

Réglage de la partie syntoniseur MA (LW) (F-X55Z(BK), F-X55ZL/ZEB unique)

- Faire les raccordements comme indiqué en Fig. 12-2.
- Enfoncer la touche MA (LW) pour régler en mode MA (LW).

Etape N°	AM SG (400Hz, 30% modulation)		Affichage de fréquence syntonisée F-X55ZL(BK) (F-X55ZL)	Réglage	
	Fréquence (kHz)	Niveau (dB)		Lieu de réglage	Caractéristiques
1	Pas de signal d'entrée		281 kHz	L503	Régler la fiche 3 de l'ensemble syntoniseur à 5,2V (±0.1V).
2	164	40	164 kHz	T501	Régler la puissance de la fiche 1 de l'ensemble syntoniseur au niveau maximal.
3	254	40	254 kHz	TC401	
4	Répéter les Etapes 2 et 3 jusqu'à ce que les taux préconisés soient atteints.				

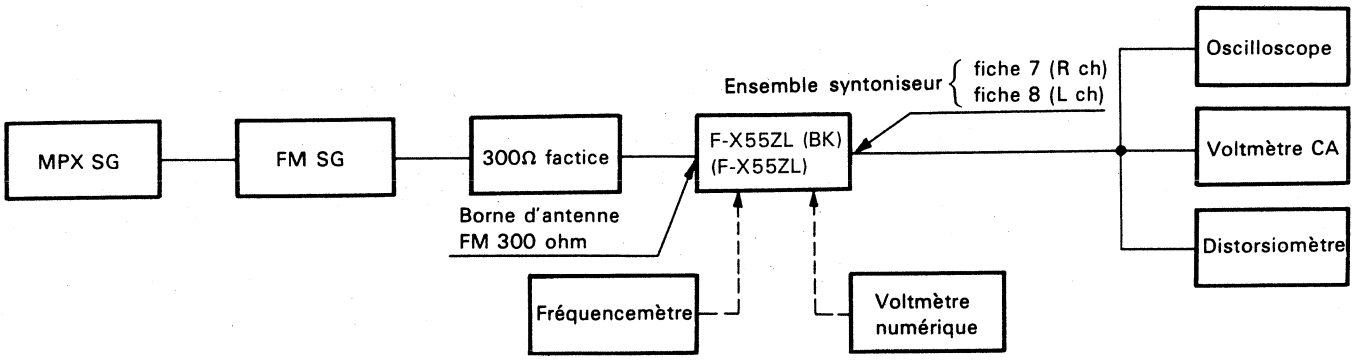


Fig 12-1 Diagramme de raccordement de réglage MF

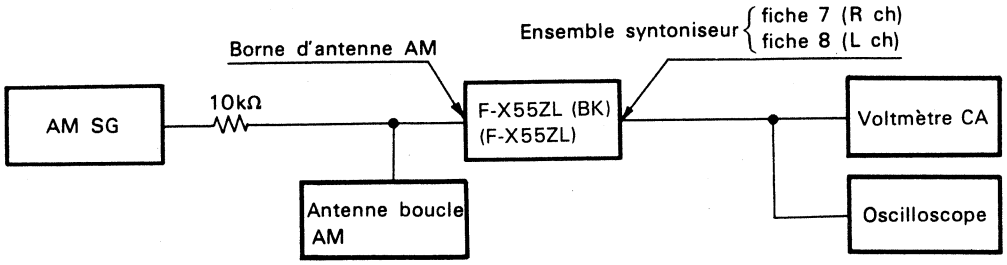


Fig. 12-2 Diagramme de raccordement de réglage MA

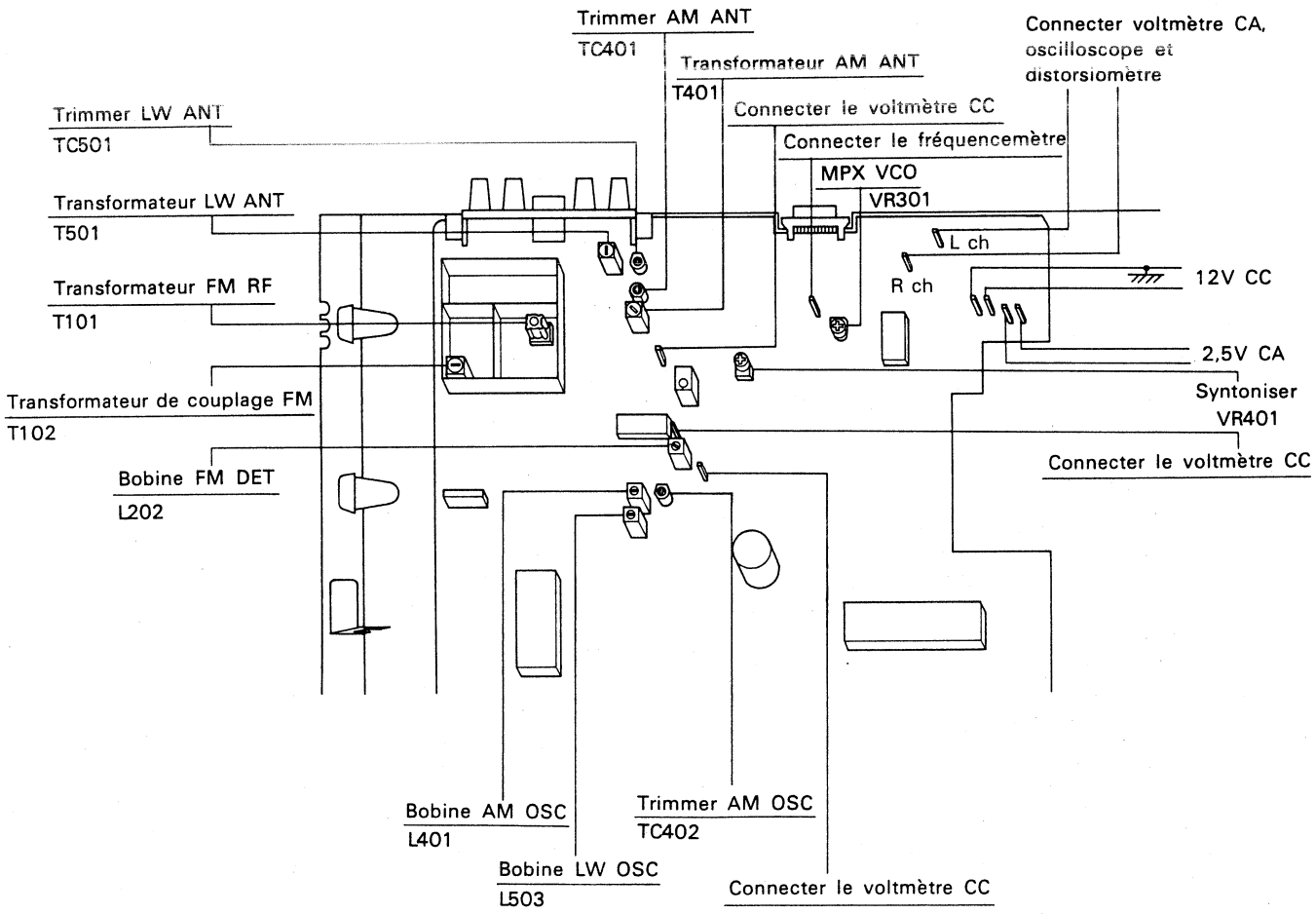


Fig. 12-3 Position de réglage

12. AJUSTE

Ajuste de la sección del sintonizador de FM

- Conecte como es indicado en la Fig. 12-1.
- Oprima la tecla de FM para fijar el modo de FM.

Nota: Modulación estereo: Principal 1 kHz L+R ± 68,25 kHz dev.
Piloto 19 kHz ± 6,75 kHz dev.

No.de paso	FM SG (1kHz ± 75kHz dev.)			Visualización de frecuencia sintonizada F-X55ZL(BK) (F-X55ZL)	Lugar de ajuste	Ajuste
	Frecuencia (MHz)	Nivel (dB)				Especificaciones
1	No hay señal de entrada			87,5 MHz	—	Inspeccione la patilla 3 del conjunto del sintonizador (3,4V ± 1,5V).
2				108,0 MHz	—	Inspeccione la patilla 3 del conjunto del sintonizador ($8{,}7V^{+2,5}_{-2,0}$V).
3	98,0	20 a 30		98,0 MHz	T101, T102	Fije la salida de la patilla 1 del conjunto del sintonizador al máximo nivel. (Antes de efectuar ajuste del paso 3, gire VR401 completamente en contra del sentido de las manecillas del reloj).
4	98,0	60	Sin modulación	98,0 MHz	L202	Fije la patilla 2 del conjunto del sintonizador a 1.4V (±0,01V).
5	98,0	80		98,0 MHz	VR401	Fije la patilla 1 del conjunto del sintonizador a 1,1V (±0,01V).
6	98,0	0		98,0 MHz	—	Inspeccione la patilla 1 del conjunto del sintonizador que esta abajo de 0,8V.
7	98,0	80		98,0 MHz	VR301	Ajuste la frecuencia en la patilla 4 del conjunto del sintonizador a 76 kHz (± 150 Hz).
	Sin modulación					
8	98,0	60		98,0 MHz	T102	Reduzca la distorción tanto en la salida del canal izquierdo como en la del derecho (ajuste T102 a dentro de ±90°)
	Modulación estereo (Nota)					
9	98,0	Variable		98,0 MHz	Confirme que se enciendan el IND STEREO y el IND TUNED cuando el nivel de FM SG es girado a alto, y que los anteriores IND STEREO y IND TUNED se apagen cuando el nivel de FM SG es girado a bajo.	
	Modulación estereo (Nota)					

Ajuste de la sección del sintonizador de AM (MW)

- Conecte como es indicado en la Fig. 12-2.
- Oprima la tecla AM (MW) para fijar el modo AM (MW).
- Fije el interruptor de AM CHANNEL STEP (paso de canal de AM) a la posición de 9 kHz. (F-X55Z(BK)/ZUC, sólo el modo Z)

No.de paso	AM SG (400Hz, 30% modulation)		Visualización de frecuencia sintonizada F-X55ZL(BK) (F-X55ZL)	Lugar de ajuste	Ajuste
	Frecuencia (kHz)	Nivel (dB)			Especificaciones
1	No hay señal de entrada		531 kHz	L401	Fije la patilla 3 del conjunto del sintonizador a 1,3V (±0,1V).
2			1602 kHz	TC402	Fije la patilla 3 del conjunto del sintonizador a 10,0V (±0,3V).
3	Repita los pasos 1 y 2 hasta que ambos valores nominales especificados sean satisfechos.				
4	603	40	603 kHz	T401	Fije la salida de la patilla 1 del conjunto del sintonizador al máximo nivel.
5	1395	40	1395 kHz	TC401	
6	Repita los pasos 4 y 5 hasta que ambos valores nominales especificados sean satisfechos.				
7	1395	Variable	1395 kHz	Inspeccione que el indicador de TUNING (sintonisación) se encienda cuando se aumenta gradualmente el nivel de AM SG.	

Ajuste de la sección del sintonizador de AM (LW). (F-X55ZL(BK), F-X55ZL/ZEB sólo)

- Conecte como es indicado en la Fig. 12-2.
- Oprima la tecla AM (LW) para fijar el modo AM (LW).

No.de paso	AM SG (400Hz, 30% modulation)		Visualización de frecuencia sintonizada F-X55ZL(BK) (F-X55ZL)	Lugar de ajuste	Ajuste
	Frecuencia (kHz)	Nivel (dB)			Especificaciones
1	No hay señal de entrada		281 kHz	L503	Fije la patilla 3 del conjunto del sintonizador a 5,2V (±0.1V).
2	164	40	164 kHz	T501	Fije la salida de la patilla 1 del conjunto del sintonizador al máximo nivel.
3	254	40	254 kHz	TC401	
4	Repita los pasos 2 y 3 hasta que ambos valores nominales especificados sean satisfechos.				

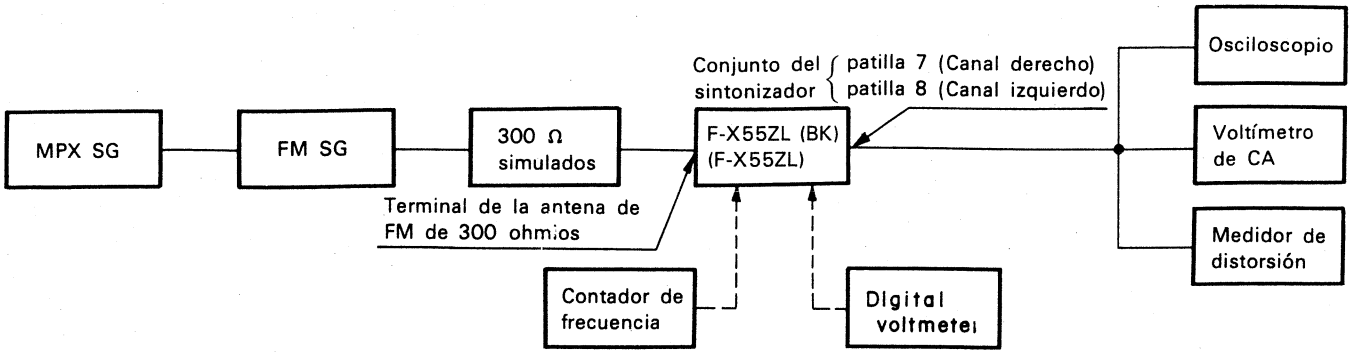


Fig. 12-1 Diagramma de conexión de ajuste de FM

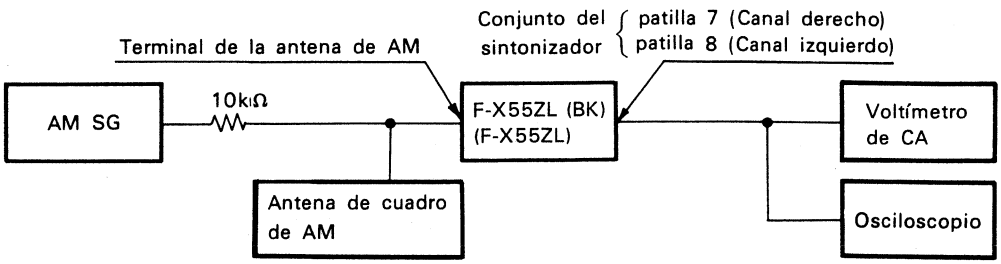


Fig. 12-2 Diagramma de conexión de ajuste de AM

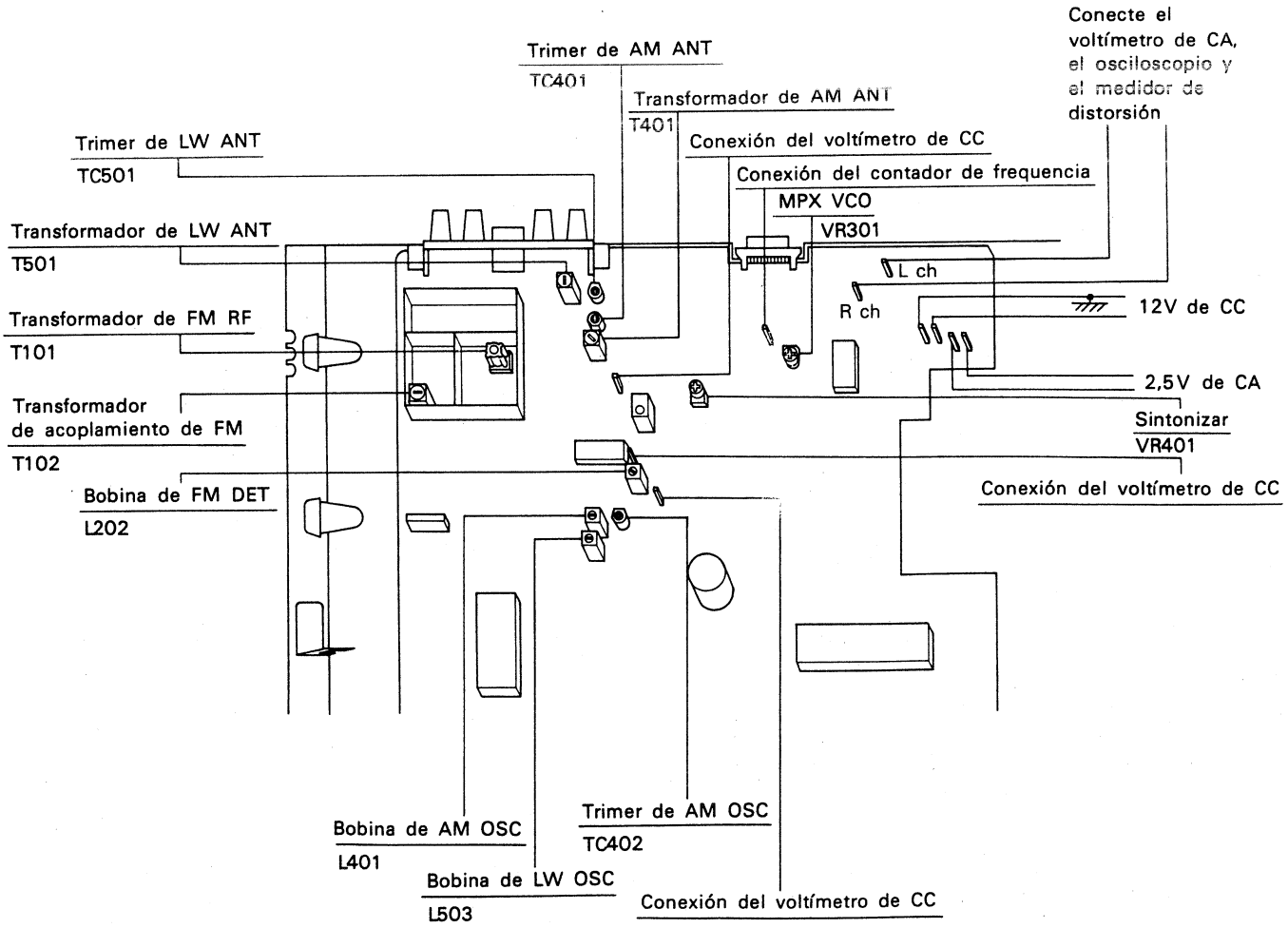


Fig. 12-3 Puntos de ajuste